Motorcycle
Electronic Cruise Control
Installation Manual

For
KAWASAKI Z1000 GTR
Concours

6 August, 1999

Manufactured by -
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MotorCycle Setup Pty. Ltd.
Electronic Cruise Control Installation Manual ©

To suit Kawasaki Z1000 GTR

Your electronic cruise control has been adapted from an Australian designed, automotive cruise control specifically to suit your motorcycle. Months of testing have resulted in changes to the electronic circuitry to deliver safe, reliable operation on the motorcycle models listed above. It is essential that you install the correct kit to your motorcycle and follow the installation instructions precisely so that electrical interference does not cause the unit to behave erratically or be rendered inoperative.

WE STRONGLY RECOMMEND AGAINST FITTING OFF-THE-SHELF MOTOR CAR CRUISE CONTROLS TO ANY MOTORCYCLE!

If, after reading these instructions, you feel you are not competent to install this kit, we strongly urge you to seek the assistance of one of our authorised dealers and installers. Please phone or email us to obtain the name of your nearest outlet. A list will also be available soon on our 'web page' - http://www.mccruise.com.

Note: - California specification motorcycles.

California spec motorcycles have an emissions control canister under the right side cover that occupies the space used by the cruise control actuator. As a result it is not possible to fit the cruise control to this motorcycle unless the canister is relocated. Relocation of the canister is the owner's responsibility and has not been considered in the design for installation on this motorcycle.

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1. INTRODUCTION

Congratulations, you have purchased one of the most advanced cruise control systems in the world - and the first after-market electronic cruise control kit adapted to motorcycles. All functions are microprocessor controlled, which reduces the complexity of installation.

Before installing your cruise control, take the time to read and understand each installation step in this manual. Several steps are dependent on others, so it is important know where and how each component is to be mounted before installation commences.

Your kit has been designed for a specific motorcycle. Even if you have installed kits before, take note of where and how components should be installed - particularly the wiring harness layout and connections.

2. WARNINGS, CAUTIONS and NOTES

This manual contains several **cautions**, **warnings** and **notes,** which are prominently displayed. The convention used is:

A **warning** applies whenever injury could result from ignoring the warning;
A **caution** applies whenever damage to the bike or cruise control could result from ignoring the caution; and
A **note** applies where other aspects should be considered before any action to do with installation is undertaken.

EXAMPLES:

WARNING: **Always ensure the bike is properly supported on the side or centre stand and cannot accidentally fall off either stand.**

CAUTION: **Before drilling any holes, make sure there are no components that may be damaged on the other side of the surface being drilled. Double check for any wiring harness which might be easily damaged by a drill bit.**

NOTE: **Do not tighten any cable ties locating the wiring harness until all cable ties are in place and all connections are complete.**

3. TOOLS REQUIRED

- A tool kit containing appropriate metric spanners and screwdrivers;
- Loctite ‘243 or 222’ or equivalent;
- A 5mm.hex key;
- A 1/4" or3/8" drive metric socket set with sizes down to 8mm is recommended.

4. PARTS LIST

Check that all components depicted in the parts list at the rear of this manual are included in the cruise control kit. Please phone (03) 9808 2804 within Australia, international (61 3) 9808 2804 or fax (61 3) 9808 2445 or email at mcsetup@netlink.net.au for advice, if any parts are missing;

5. OVERVIEW OF CRUISE CONTROL OPERATION

The principles behind your cruise control's operation are very simple:

- The computer continuously monitors the frequency of electrical pulses generated by magnets passing the sensor;

- When the SET key on the switch is pressed the computer stores the pulse frequency at the time in memory and then continuously adjusts the vacuum actuator, which controls the carburettors to maintain the pulse frequency at the same figure to which it was set. If the frequency drops below the set frequency, the computer applies more throttle. If the frequency is above the set frequency, the computer turns the throttle off. The key is that the computer monitors and reacts to changes very quickly and smoothly so that the speed effectively remains nearly constant.

There are seven major components in your kit: the computer, the vacuum actuator, the cable interface unit, the speed sensor, the switch, the electronic clutch switch and the loom. The functions of each are described below:

- the computer - monitors road speed, adjusts the throttle by controlling the vacuum actuator & monitors the switch and brake system for instructions from these components;
- the vacuum actuator - controls the carburettors by pulling or releasing a cable which attaches to the carburettors via the cable interface unit (CIU);
- the CIU - translates the motion from the throttle grip and the vacuum actuator to the carburettors via a new cable supplied in the kit;
- the speed sensor - generates electrical pulses when the bike is in motion;
- the switch - sends instructions from the rider to the computer;
- the electronic clutch switch (ECS) – monitors engine speed and disengages the cruise if the clutch is disengaged; and
- the electrical loom - which connects the switch, the computer, the vacuum actuator, the sensor, the ECS and the brake system.

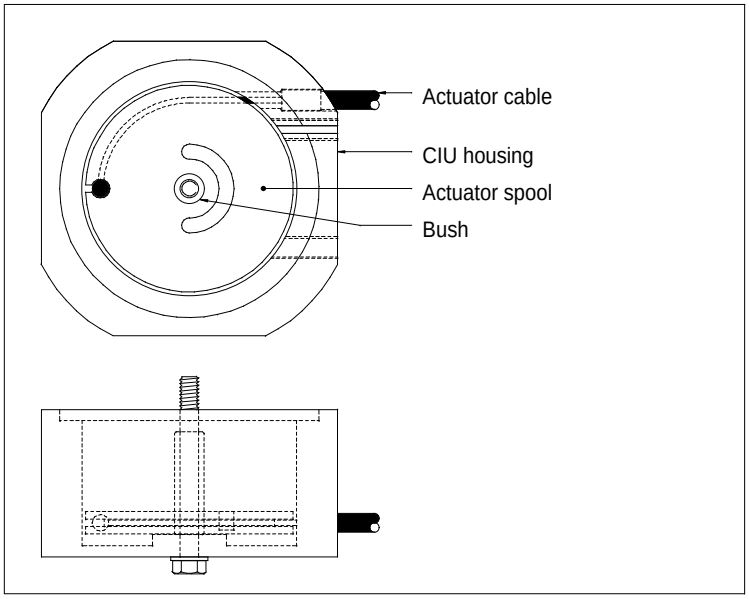
The cable interface unit is a new component developed and patented by MotorCycle Setup and is the key to safe cruise control operation on motorcycles. An understanding of how it works should help you avoid making mistakes during installation.

The following diagrams show the basic assembly procedure and operating principles of the cruise control Cable Interface Unit (CIU). The actual entry points of cables and the direction of rotation may differ depending on the model of the motor cycle, but the principles involved remain the same. Specific assembly instructions are provided later within this manual.

In order to improve the clarity of the diagrams, the multiple holes in the dual spool have been omitted, with only the actual holes used for the cable nipples being shown.

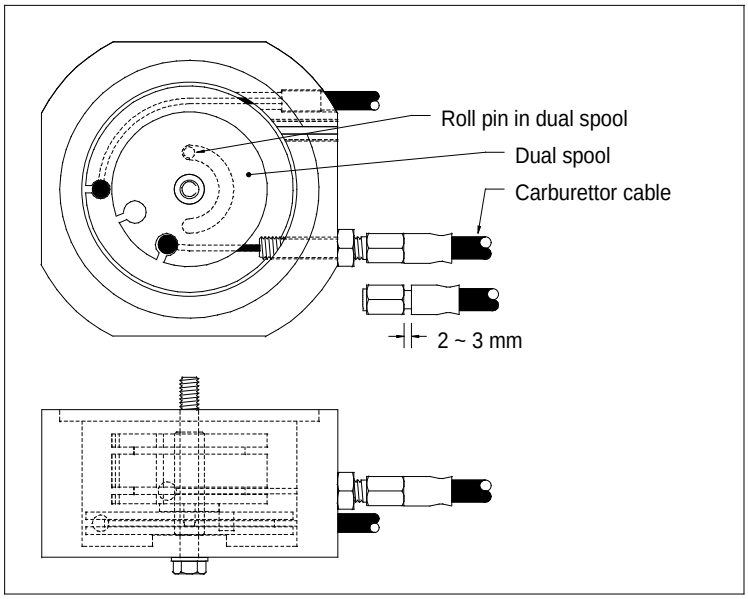
1st step.

The actuator spool is installed in the CIU housing with the actuator cable. The actuator spool is rotated to fully extend the cable.



2nd step.

The dual spool and carburettor cable are installed. The carburettor cable is attached to the lower groove in the dual spool. The other end of the carburettor cable is attached to the carburettors.



Note the position of the roll pin. It is nearly contacting the end of the groove in the actuator spool. The free play in the carburettor cable must be adjusted so that the cable outer can be pulled out 2 ~ 3mm before the carburettors start to open. This ensures that the cruise control cannot prevent the carburettors returning to idle. If more free play is allowed the response of the cruise control is compromised.

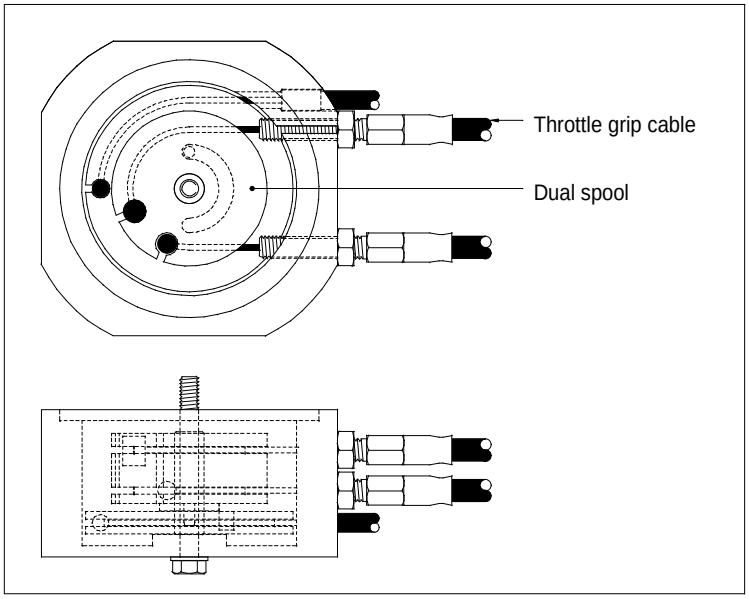
This adjustment of free play is usually performed after final assembly of the CIU is completed and the CIU is in its final location. This is because flexing the cable affects the free play. It is shown at this stage in these diagrams to improve clarity.

After this adjustment is performed, the carburettor cable adjustment MUST NOT BE MOVED. All future adjustments of free play in the throttle must be performed on the throttle cable from the throttle grip. If incorrect free play in the carburettor cable is suspected due to inconsistent cruise operation or because of inconsistent idle speed, the adjusters on the throttle cable from the hand grip must be backed all the way off to give as much free play as possible. If this does not result in AT LEAST 5mm of free play in the throttle cable, the throttle cable must be removed from the hand grip or CIU before adjustment of the carburettor cable is attempted. This is crucial because the amount of free play in the throttle cable also affects the apparent free play in the carburettor cable.

3rd step

The throttle cable is installed. The throttle cable is attached in the upper groove in the dual spool.

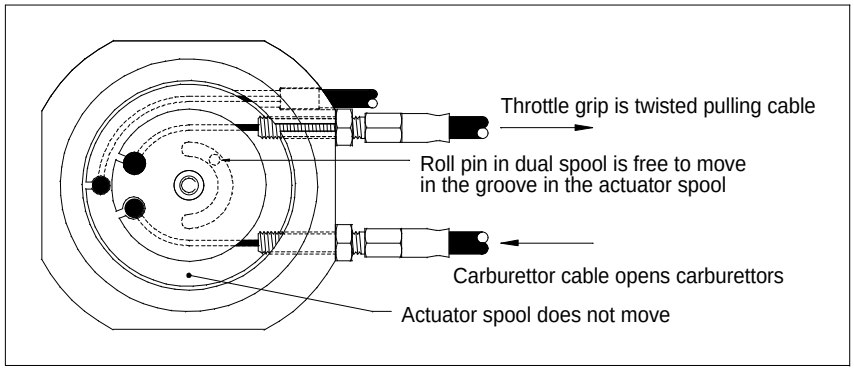
Normally the end cap and retaining nut would be installed at this point. These items are not shown in order to improve clarity.



Normal throttle operation

During normal operation of the throttle, the throttle cable is pulled by twisting the throttle grip. This pulls on the dual spool and rotates it, thus pulling the carburettor cable and opening the carburettors.

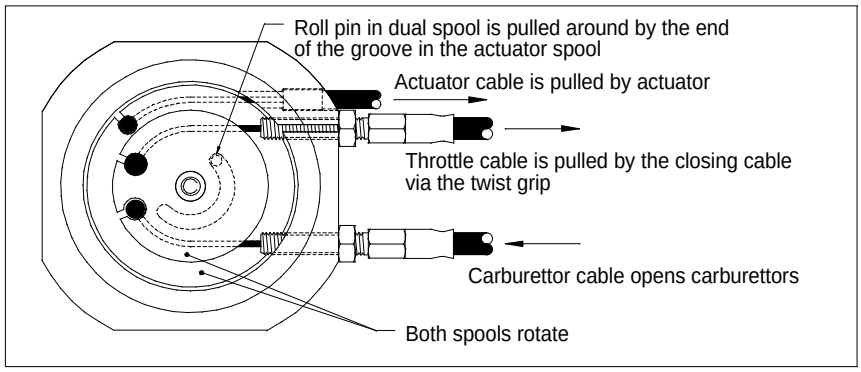
Because the roll pin is free to move in the groove in the actuator spool, this spool does not move. This reduces friction in the throttle system and prevents any possibility of jamming due to cables buckling when being pushed.


Throttle grip is twisted pulling cable
Roll pin in dual spool is free to move in the groove in the actuator spool
Carburettor cable opens carburettors
Actuator spool does not move

Cruise operation

During cruise operation the actuator cable pulls the actuator spool and rotates it. The end of the groove contacts the roll pin in the carburettor spool, rotating the spool and pulling the carburettor cable.

When the carburettors open the closing cable on the carburettors is pulled. This results in the twist grip rotating, once all the free play is taken out of all the cables. As a result, the rider will notice the twist grip moving while the cruise is operating.


Roll pin in dual spool is pulled around by the end of the groove in the actuator spool
Actuator cable is pulled by actuator
Throttle cable is pulled by the closing cable via the twist grip
Carburettor cable opens carburettors
Both spools rotate

It is possible to roll the throttle off by hand, thus opposing the cruise control actuator. As this will result in a loss of speed the cruise control computer will 'read' this as the bike going up an incline, and attempt to apply more throttle. If the twist grip is released again, it is possible for the throttle to go immediately to full throttle. While the throttle will back off again as soon as the set speed is reached or if the rate of acceleration exceeds

the cruise controls preset rate (1 ~ 2 km/h gain in speed per second), the initial acceleration could be quite violent. As a result, we do not recommend manually forcing the throttle off while the cruise control is engaged.

If the throttle grip is twisted open while the cruise control is engaged the cruise control is over ridden by the rider. When the throttle is released, the cruise control will resume control, unless it has been disengaged by brake operation or if the motor cycle exceeds the current set speed by 150% such as during an overtaking manoeuvre. The cruise will also disengage if the speed drops to 75% of set speed such as when riding up hill. This is unlikely to occur on large capacity motorcycles.

6. PREPARING THE BIKE FOR CRUISE CONTROL INSTALLATION

Remove the following items from the bike:

- the seat;
- the petrol tank;
- the RHS side cover;
- the tool kit and the battery cover.

LUBRICATING THE THROTTLE GRIP – this is <u>essential</u> maintenance.

- Remove the two screws which mount the throttle switch block;
- Pull the two halves of the switch block apart;
- Remove the cable nipples from the handgrip and the RHS handlebar weight. Slide the handgrip off the bar;
- Run 6 drops of light oil - eg sewing machine oil (not engine oil) down each throttle cable;
- Apply a thin film of engine oil to the handlebar and re-install the handgrip and switch block.

7. INSTALLATION

The main components to be installed include the **wiring loom**, the **cable interface unit**, the **vacuum actuator** that controls the carburettor via the cable interface unit, the **computer**, the **speed sensor** and the **switch**. Installing components in the following order has been found to be the most efficient.

7.1 INSTALLING THE CRUISE CONTROL SWITCH

- Remove the cap screws from the clutch master cylinder mounting clamp on the handlebar (LHS);

- Remove the clamp bracket from the handlebar and use a file, grinder or sandpaper on a flat surface to remove material equivalent to about ½ the thickness of the switch mounting bracket from the lower face of the clamp;

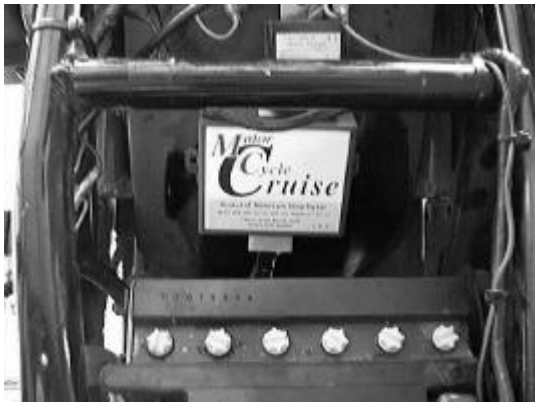
Noting the 'up' arrow on the clamp, put the top bolt into the clamp, then the bottom bolt through the clamp and switch bracket;

- Screw the cap screws into the master cylinder using a 5mm hex key and position the master cylinder and clutch lever in the correct position. Tighten the bottom cap screw, then the top one;

- Run the switch wire down the handlebar with the existing loom using cable ties, then backwards with the choke cable, until it rests in the centre of the bike above the carburettors. The plug will be connected later.

NOTE: The picture depicts the switch wire position above the LHS ignition coil (fingers at right of photo) and the final position of the throttle cable to be re-located later (fingers at left of photo). Note the switch wire should run UNDER the rear coil mounting lug.

7.2 INSTALLING THE COMPUTER



- Clean the rear mudguard behind the battery with methylated spirits (wood alcohol) on a cloth;
- Clean the underside of the computer as well;
- Apply two of the self-adhesive pads lengthwise to the underside of the computer and press the computer firmly against the mudguard until it sticks firmly. Be careful to keep the computer vertical when applying it to the mudguard - it cannot be moved once the pads touch the mudguard.

7.3 INSTALLING THE ACTUATOR

- Thread the actuator cable forward behind the RHS vertical frame rail in front of the battery box, over the RHS rear of the crankcase, up to the left side of the rocker box (cam cover) and lay the end on the RHS front rocker box until later;
- Slide the actuator bracket down in the recess in the RHS of the battery box until the actuator bracket rests firmly on the plastic lip;
- Use a cable tie to attach the cable at the end of the actuator to the vertical frame rail to hold the actuator in place.

7.4 INSTALLING THE VACUUM HOSE

- Attach the vacuum hose supplied to one of the RHS carburettors vacuum balance port. The photo shows the location of the balance port on the USA version of the bike. Install the hose with the black end of the one-way valve closest to the carburettors;

- Thread the hose backwards over the carburettors under the frame rail initially then above the frame rail above the airbox. Continue running the hose downwards under the front of the actuator, as shown in the photograph, and attach it to the actuator.

7.5 INSTALLING THE CABLE INTERFACE UNIT (CIU)

- Back-off the cable adjuster at the throttle grip all the way;
- Disconnect the opening throttle cable – the rear cable on the carburettors;
- Withdraw the opening cable from the carburettors. Re-route the cable so that it runs around the outside of the LHS coil above the rear rocker box and inside the left frame tube (between the frame tube and the coil).

- The end of the throttle cable should terminate above the rear RHS rocker box;
- Run the first lock nut on the throttle cable to the top of the adjuster and tighten it gently. Run the second lock nut up the adjuster, but do not tighten;

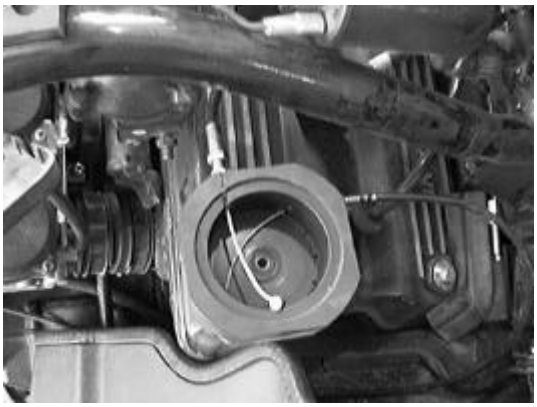
- Loosen the lock nuts on the **closing** cable adjuster at the carburettors:
- Screw the top lock nut all the way up the adjuster and run the bottom lock nut down the adjuster within two or three threads of the end of the adjuster;

NOTE: the next step is very tricky. Sometimes the nipple falls into place and other times you just have to be persistent. If you find you can't re-install the nipple, remove a **maximum of 2mm off each end of the nipple** with a file, taking care not to distort the cylindrical shape of the nipple - and try again. We find a long thin screw driver, an old hacksaw blade, two people and lots of light help enormously!

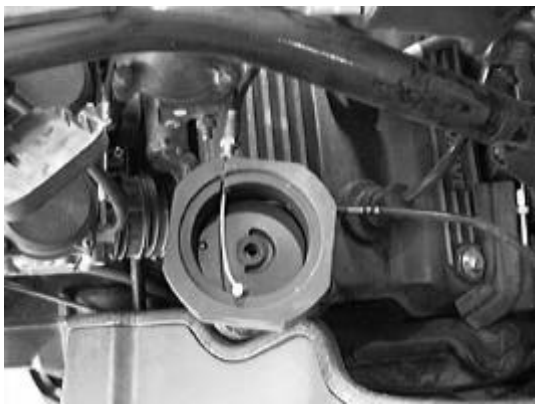
- Install the cylindrical nipple on the new carburettor cable supplied in the kit on the carburettor spindle where the original throttle cable attached. Lock up the nuts on the adjuster so that it is about mid-way on the threaded adjustment; be careful not to over tighten the lock nuts. The adjusters are made of brass and can be broken if over tightened. If desired, a drop of low strength thread locker such as Loctite 222 can be applied to the threads before installation.
- Run the carburettor cable forward to the **left** of the choke cable and the thermostat, then to the RHS of the bike above the rocker box (camshaft cover);

NOTE: If the carburettor spindle is stiff, spray the carburettor spindle mechanism with a suitable lubricant. Silicon or Teflon sprays are recommended. De-watering fluids such as WD40 or CRC 5-56 are not recommended as they may attract dust.

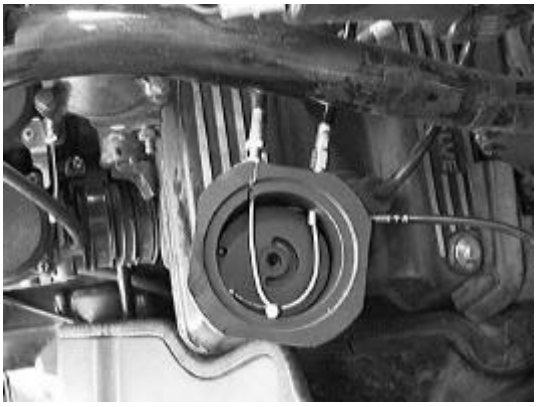
- Insert the throttle cable in the slot in the CIU and rotate the CIU onto the throttle cable adjuster. Note that the adjuster is fixed to the cable, so the CIU must rotate. Thread the adjuster into the CIU until the end is <u>level with the inside wall of the CIU</u>, then gently tighten the lock nut with the CIU temporarily above the right rear rocker box;



- Insert the actuator cable into the **unthreaded** hole in the CIU with the retaining screw in it. Apply Loctite 222 or 243 to the screw and tighten it gently to retain the cable in the CIU**. CAUTION**: Take care not to squeeze the cable outer with the screw so that the inner cable jams. Check this by sliding the actuator cable in and out by hand while carefully locking the outer cable with the retaining screw;



- Insert the ball nipple on the actuator cable into the actuator spool and locate the spool in the <u>CIU with the semi-circular groove facing upwards</u>. Rotate the spool anti-clockwise to fully extend the cable;



- Insert the ball nipple on the <u>carburettor cable</u> into the last threaded hole and screw the adjuster all the way in;

- Locate the ball nipple in the marked hole in the **roll-pin side** of the dual spool and place the dual spool in the CIU <u>so that the roll-pin engages in the groove</u> in the actuator spool;
- Place the nipple on the <u>throttle cable</u> in the marked hole **in the top** of the dual spool;
- Insert the bush into the two spools;
- Place a flat washer on the 5mm bolt. Install it in the hole in from the bottom of the CIU.

- Install the endcap on the top of the CIU;

- Place a flat washer on the bolt and install the Nyloc nut on the **top** of the CIU, but do not tighten yet;

- Adjust the carburettor cable to give 2-3mm free movement between the outer cable and the adjuster - see photo. Lock up the adjuster;

WARNING: THE PROCEDURE JUST DESCRIBED CONTROLS THE FREE PLAY BETWEEN THE CRUISE CONTROL AND THE CARBURETTORS. THE ADJUSTERS SHOULD NOT BE MOVED AFTER THIS INITIAL SETTING. ANY FUTURE ADJUSTMENT OF THROTTLE GRIP FREEPLAY MUST BE DONE ONLY WITH THE CABLE ADJUSTERS AT THE THROTTLE GRIP END OF THE CABLES, NOT THE CARBURETTOR CABLE ADJUSTERS. <u>THIS POINT MUST BE STRESSED TO THE OWNER.</u>

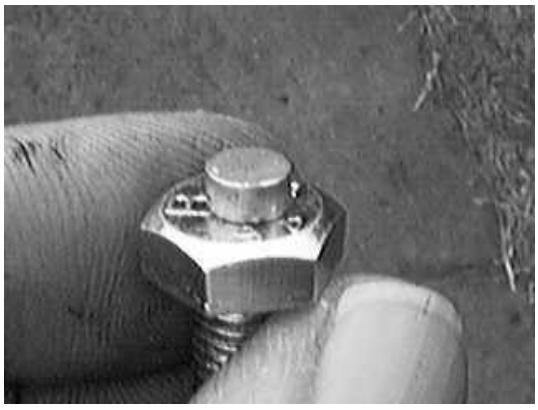
- Install the CIU mounting bracket as shown in the photos. Position the curved sections of the bracket on the frame rail as far forward as possible with the leading edge against the frame gusset.

- Remove the nut and washer from the top of the CIU through bolt and mount it on the bracket as shown with the washer and nut on top of the bracket. Position the bracket so the CIU will not touch the rocker box or spark plug cap and is not so high that it will touch the petrol tank and rub a hole in it.

- **Use side-cutters or tin snips to cut off the excess length in the hose clamps so that they will not rub holes in the petrol tank.**

- Squeeze a little silicone sealant, such as Silastic, into the slot in the CIU where the throttle cable was installed to seal the CIU from dust and water;
- Set the adjuster at the throttle grip mid-way in its adjustment range;
- Adjust the free play in the throttle grip using the adjuster at the carburettors on the closing cable to suit your requirements. Ensure the cables do not bind when the handlebars are turned lock to lock. In future, fine adjustments to the free play can be performed using the adjuster at the throttle grip if required;
- Finally, position the original throttle cable, which goes to the CIU as shown in the photo and cable tie it to the frame rail.

7.6 INSTALLING THE SPEED SENSOR



- Use a bolt with a magnet attached as shown in the photos to place one of the magnets in a clean hex head hole in the rear disk brake mounting bolt. Slide the bolt sideways to detach the magnet from the bolt when in position in the Allen screw;

- Hold the other magnet close to the first one and determine which end sticks to the magnet in the Allen screw. Note the end which sticks and put this face into the diametrically opposite allen screw in the disk, so the two magnets are equally spaced around the disk with the same 'pole' facing outwards. It is vital that this procedure is followed correctly. If opposite poles face the sensor, the cruise control will NOT work..

- Remove the nut from the brake torque arm and install the sensor mounting bracket as shown in the photo. Rotate the bracket backwards until the sensor rests on the calliper mount. Use Loctite 222 or 243 on the nut and ensure it is tight.

- Finally attach the sensor wires to the sensor when the loom is installed and run the wire as per the instructions (see next section for loom installation)

7.7 INSTALLING THE WIRING LOOM

- Plug the 12 pin plug on the loom into the computer and feed the loom to the RHS of the bike behind the battery box;
- Connect the red, white and black actuator wires to the actuator;
- Run the green earth lead back up inside the frame rail and plug it into the accessory earth (ground) plug with the black/yellow wire (the black wire with the yellow trace) attached. The accessory earth plug is on the rear mudguard (fender) behind the battery and tool kit and has provision for two bullet connectors. **Take care to select the correct plug. If you use the wrong one there will be a direct short circuit in the electrical system;**

- Disconnect the two bullet connectors which join the bike main loom wires to the rear brake switch;
- Connect the two brown wires on the loom to the wires coming from the brake switch;
- Connect the red and orange wire on the cruise loom to the red/blue wire (the red wire with the blue trace) on the bike's loom;
- Connect the blue wire on the cruise control to the blue/red wire (the blue wire with the red trace) on the bike's loom;
- Run the speed sensor wire down to the brake line leading to the rear brake and clip it onto the swing arm using the same clips as the brake line. Cable tie it in place;
- Attach the blue and black speed sensor wires to the speed sensor - it doesn't matter which wire connects to which terminal;
- Finally, run the switch wire below the actuator, up under the top frame rail and forward under all frame rails and connect it to the four pin switch connector, which was previously installed.

7.8 INSTALLING THE ELECTRONIC CLUTCH SWITCH (ECS)

- **How the ECS works.**

The electronic clutch switch (ECS) is not a true switch, but is a device that monitors the rate of gain of engine speed and also the absolute speed of the engine by monitoring ignition pulses. If the switch detects a rapid increase in engine speed, such as when the clutch is disengaged while throttle is applied, the ECS will activate and disengage the cruise control. The switch does not respond to a decrease in engine RPM. For example, if the motorcycle is travelling down a hill with the cruise engaged and no throttle applied, and the clutch is disengaged by the rider, the engine speed will drop to idle. The ECS will not disengage the cruise control. When the speed of the bike drops to the set speed the cruise will apply throttle. Only when the engine speed starts to increase will the ECS detect the change, and then disengage the cruise.

The switch will detect the engine speed increase and switch off the cruise by the time the engine has gained 1,000 ~ 2,000 RPM. How high the engine revs above the initial 1,000~2,000 depends on how much throttle the cruise has applied at the time. If the throttle is open a significant amount, such as when travelling up a hill, the time taken for the throttle to return to idle position may mean the engine gains a lot of revs when the clutch is pulled in.

If the cruise has only applied a small amount of throttle the rate of change in the engine speed may be so slow that the ECS will not detect it at all. The engine may reach redline or beyond if the rate is slow enough, although this is unlikely. For this to occur the engine would have to take 5 seconds or more to go from idle to redline. On high revving motorcycles (sports engines) the ECS should activate regardless before redline is reached as the engine speed exceeds the inbuilt limits of the ECS.

- **Fitting the ECS**

- Locate the ignition coils. The pair of coils are under the fuel tank, mounted immediately behind the steering head. Both coils have red wires going to them. One coil also has a green wire and the other has a black wire going to it. Disconnect either the green wire or the black wire from its coil spade terminal, whichever is easier.

- Ensure the area where the ECS will be mounted is clean by wiping the mudguard with methylated spirits before mounting the switch. Check to see that there is sufficient length in the wires to allow the switch to mount where you want to put it. Mount the clutch switch on the rear mudguard, near the cruise control computer using the self adhesive pad on the switch or screws through the tabs.

- The clutch switch has four long wires coming out of it. Connect them as follows:

- Route the orange and purple wire to the cruise control computer. Connect the plug on the wires to the matching plug on the short leads from the computer plug.

- The green earth wire with the eye connector should be attached under the head of the bolt that holds the rear fairing in place immediately behind the brake fluid reservoir (see photo) or any other convenient 6mm bolt that will provide an earth. **Do not** use the brake fluid reservoir mount as it is not earthed.

- The yellow ignition sensor wire should be run with the cruise control loom forward until the coils are reached. Run the wire to the coil terminals. Connect the terminal to the coil. Place the previously disconnected wire from the coil on the piggy back spade connector.

- Cable tie the ignition sensor wire to the cruise control loom in a few places. Ensure that all other wires are routed neatly and cable tie if required.

Your cruise control is now ready for testing!

NOTE: **<u>After</u> diagnostic testing, re-install the battery cover, fuel tank, the side cover and the seat.**

8. DIAGNOSTIC MODE OPERATION

Your cruise control comes with a means of making it operate the throttle without the speed sensor detecting movement. This is the best way to check that the electrical and mechanical operation of the cruise control is working properly - excluding speed control circuits.

- Note:- During the diagnostic checks many of the features of the cruise control are confirmed by the LED (light) on the computer operating. For example, brake switch operation is confirmed by the LED. The LED only stays on for a few seconds with most operations. If the brake pedal is pushed, the LED will come on. If the pedal is held after a few seconds the LED will go out. If the pedal is released and re-applied, the LED will come back on, and then turn off after a few seconds. THIS IS NORMAL AND DOES NOT INDICATE A FAULT IN THE SPEED CONTROL. This applies to most operations performed in diagnostic mode.

- Turn the cruise control ON/OFF switch to OFF;
- Turn the ignition switch ON but DO NOT start the engine. Check that the kill switch is also ON.
- Depress and hold the SET key while turning the cruise control ON;
- Take your finger off the SET key;
- Pull the front brake lever and depress the rear brake pedal a few times. The LED on the computer should illuminate when EITHER lever is used. This indicates that the cruise control will cancel when the brakes are applied. If the LED does not come on, the most likely cause is incorrect adjustment of the brake switches. If either of the switches is adjusted so that it does not turn OFF at all, the light WILL NOT COME ON AT ALL. It is then necessary to adjust the switch so that it turns OFF when the brake is released. IF THE BRAKE SWITCH OPERATION IS NOT CONFIRMED BY THE LED OPERATING ON THE COMPUTER NOTHING ELSE WILL WORK ON THE CRUISE CONTROL. See the next section.
- Now tap the SET key once while listening for a click from the vacuum actuator and watching the red LED on the front of the computer. You should hear the click and see the LED flash. Depress and hold the SET key. The LED should come on and stay on while the SET key is depressed and regular clicks should be heard from the actuator.
- Now tap the RES key once while listening for a click from the vacuum actuator and watching the red LED on the front of the computer. You should hear a slightly different sounding click and see the LED flash. Depress and hold the RES key. The LED should come on and stay on while the RES key is depressed and regular clicks should be heard from the actuator.
- Turn the cruise control power switch OFF;
- Start the bike in neutral;
- Depress and hold the SET key while turning the cruise control ON;
- Take your finger off the SET key;
- Now tap the set key once while listening for a click from the vacuum actuator and watching the red LED on the front of the computer. If you hear the click and see the LED flash, tap the SET key a few more times until the revs start to rise. Depress the RES key and the revs will drop. Some delay occurs with these operations.

CAUTION: You need to be careful not to tap the SET key too many times as it is easy to over-rev the engine if you tap it too often. If the engine revs too fast quickly turn off the cruise control switch OR the bike's KILL switch. If the ECS (electronic clutch switch) is working correctly it should protect the engine by shutting off the cruise control before such high revolutions are reached;

CAUTION: IT IS VERY EASY TO OVER-REV THE BIKE IN THE NEXT STEP - SO BE CAREFUL!

- When you are sure single taps work, depress and hold the SET key for a couple of seconds and see if multiple pulses are sent to the actuator. Listen for clicks and look at the LED.

Checking the speed sensor: With the cruise in diagnostic mode, put the bike on the centre stand with the engine running, engage 4th or 5th gear and carefully accelerate the engine until the rear wheel is spinning at 60 or 70 kph (35~45 mph). Observe the LED on the computer to see it flashes regularly. It should flash quite slowly at these speeds - at 1-2 second intervals.

Checking the ECS: With the cruise in diagnostic mode with the engine running, observe the red LED indicator on the clutch switch and the LED on the computer. Quickly rev the engine by 'blipping' the throttle. The LED's should illuminate briefly as the engine reaches 2,000~3,000 RPM if the engine starts from idle.

The slower the rate of increase of revs, the higher the revs required to make the LED's light. A quick blip should resulting in the LED's coming on at about 2,000~2,500 RPM. A slow increase in revs may not see the LED's coming on until 4,000 RPM or more. When the LED's come on it indicates that the cruise control will be cancelled. Remember, if the cruise is NOT in diagnostic mode, only the ECS LED will illuminate. The cruise must be in diagnostic mode if the cruise computer LED is to illuminate too.

Using the bikes throttle raise the engine speed to the same revs that would be used at typical 'cruising speed' ie about 100kph (60mph), typically 3500~4000 RPM. The LED on the ECS should come on. Hold the engine speed constant. The LED should turn off after 5~20 seconds.

If the LED does not turn off after 30 seconds, the cruise control may not work and the sensitivity of the switch may need to be adjusted. The adjustment procedure is described in Section 12, Road Test and Adjustments.

NOTE: Remember to wait at least 5 seconds after turning the cruise control off when in diagnostic mode to then use it in cruise control mode – otherwise it stays in diagnostic mode. It takes time for the capacitor which protects the computer from surges in the power supply to discharge fully.

9. MANUAL ADJUSTMENTS TO THE BRAKE PEDAL AND FRONT BRAKE LEVER

Since the brakes are the fastest way to turn the cruise control off, it is ESSENTIAL that they be adjusted optimally to suit the rider AND that they activate the rear brake lamp as quickly as possible. It is recommended that both front and rear brakes be set up so that the brake lamp turns on as early as possible when either brake is applied. Naturally you have to ensure that the brake lamp does turn off - otherwise the cruise control will not work at all. Careful adjustment of the foot brake lever so that the rider's foot does not have to lift up to reach it is recommended. Next, adjust the brake switch so that it turns on with very little movement of the brake pedal. Repeat this process with the front brake lever.

It is recommended you adjust the rest position of the **gear lever** to the foot brake lever for optimum rider comfort.

NOTE: IF THE REAR BRAKE LIGHT FILAMENT OR FUSE BREAKS, OR THE BRAKE LIGHT IS ON, THE CRUISE CONTROL WILL NOT WORK AT ALL. IF YOUR CRUISE CONTROL APPEARS NOT TO BE WORKING, THESE ARE THE FIRST THINGS TO CHECK.

10. OPERATING INSTRUCTIONS

Although your cruise control has many sophisticated features, it has been designed to be very easy to operate. Its operating range is from about 40kph (not recommended) to approximately 180kph (also NOT recommended).

The cruise control operates by monitoring the road speed of the bike and uses a computer to maintain any 'set' speed within its operating range. The computer is instantly de-activated by either front or rear brake lever pressure sufficient to turn on the brake lights.

All commands are input using the three switches on the switch block.

The functions performed by each key are as follows:

ON/OFF Switch

The OFF-ON switch is a slide switch and 'enables' the SET/ACC (Set/Accelerate) and RES/DEC (Resume/Decelerate) keys when turned ON. The SET/ACC and RES/ACC switches are activated by depressing them. Turning the OFF-ON switch OFF disables the cruise control.

SET key - maintains speed or produces acceleration

The SET key has four functions:

1. When the bike is in motion within the cruise control's operating range, depressing and releasing the SET key sets the computer to maintain the speed at the time the SET key was depressed;

2. While the cruise control is controlling the bike's speed, firmly but quickly tapping the SET key increases the set speed by about 2kph for each tap. Six (6) taps in rapid succession increases the set speed by approximately 10kph. Different bikes respond slightly differently. Experiment until you find out precisely how your bike responds;

3. While the cruise control is controlling the bike's speed, depressing and holding the SET key results in the bike smoothly accelerating until the SET key is released (or until the bike achieves the cruise control's maximum operating speed - this is not recommended). The rate at which acceleration takes place is a function of the power of the bike and the position of the sensitivity switch [Refer to section 10] on the cruise computer;

4. Used in conjunction with the ON/OFF switch, it puts the cruise control in 'diagnostic mode'.

While riding the bike, the cruise control can be set to a higher speed by:

a. Opening the throttle and pressing the 'SET' key after the required speed is reached;

b. Tapping the 'SET' key to progressively accelerate the bike;

c. Depressing and holding the 'SET' key until the required speed is reached.

RES key - resumes the previously set speed or produces deceleration.

1. If the cruise control has been controlling the bike's speed and has been deactivated using the brakes AND the cruise control or engine have not been turned off, depressing and releasing the RES key causes the cruise control to return to its previously set speed;

2. If the cruise control **is controlling** the bike's speed, tapping the RES key decelerates the bike by approximately 2kph per tap;

3. If the cruise control **is controlling** the bike's speed, depressing and holding the RES key down, decelerates the bike until it is released or the bike slows beyond the cruise control's operating range. Releasing the key sets the computer to the current speed.

NOTE: **1. If the bike's speed drops below 75% of the SET speed, the cruise control deactivates by itself. This could happen on a very steep incline, but is very uncommon on large capacity bikes. If it does, simply accelerate using the throttle and SET the cruise control again.**

2. If the bike's speed increases to 150% of the SET speed, the cruise control deactivates by itself. This can happen when accelerating to pass a car. If it does, simply decelerate using the throttle and SET or RESume the cruise control again.

11. SAFETY ISSUES & FEATURES

Electrical 'Noise'.

Noise is a broad term used to describe the electromagnetic radiation of energy. Noise is generated during rapid changes in voltage or current levels or by radio transmitters (ignition systems, alternators, mobile phones and other heavy current carrying wires). If noise gets coupled into the cruise control wiring harness it can create disturbances within the cruise control computer. The cruise control may drop out after engagement or not engage at all, but still pass all diagnostic tests.

The most likely causes of electrical noise interference on a motorcycle is faulty spark plug leads or fitment of non suppressed spark plug leads, or the electrical system could be in poor repair due to age or lack of appropriate preventative maintenance.

WARNING: - It is ESSENTIAL that the spark plug leads are radio suppression type leads and that they are in good condition. Inspect the spark plug leads for any cracks, and replace if required. All original equipment high-tension ignition leads, in optimal condition, should be acceptable, but the cruise control MUST NOT BE FITTED IF AFTERMARKET SOLID CORE HIGH TENSION LEADS ARE FITTED.

Ideally all cruise control wiring should be kept as far as possible from all high voltage and high current wiring. This is often difficult to achieve on a motorcycle due to space limitations, so it is important to FOLLOW THE WIRING HARNESS INSTALLATION INSTRUCTIONS CAREFULLY.

WARNING: - Make sure that the bike's battery and charging system are in good condition and the battery electrolyte levels are correct and the battery connections are clean and tight. The battery acts as an electrical 'buffer' and absorbs electrical spike energy and stabilises voltage in the electrical system.

Features.

The cruise control can be shut off by any of the following methods:

a. Depressing either brake pedal/lever;
b. Sliding the ON/OF switch to the OFF position;
c. Decelerating to 75% of the set speed;
d. Accelerating to 150% of the SET speed;
e. Pulling in the clutch lever to trigger the ECS;
f. Pressing the kill switch on the engine;
g. Turning off the ignition key.

The cruise control will disengage if any of the connectors become separated, if the brake light filament breaks or the brake lights lose power - for example if a fuse blows.

There are numerous safety features designed into the computer and throttle actuator to ensure that should one or more components fail there is still a way to turn off your cruise control.

For safe and economical motoring NEVER operate this or any cruise control in:
- **congested or heavy traffic;**
- **on wet or slippery roads.**

WARNING: Your cruise control is designed with numerous safety features, but only the motorcycle KILL SWITCH or the IGNITION KEY can overcome a runaway condition caused by a tangled or jammed carburettor linkage. Our patented Cable Interface Unit has been specifically designed to eliminate the possibility of such an event. Without it, it is virtually impossible to SAFELY fit a cruise control to most motorcycles.

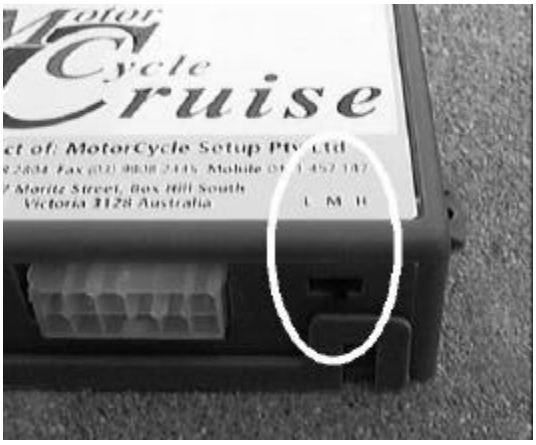
Regular inspection of control cables is recommended to prevent jamming of the throttle, which could occur if cables were frayed or damaged.

12. ROAD TEST AND ADJUSTMENTS

Your cruise control comes pre-adjusted from the factory and if installed properly should provide satisfactory performance on most bikes. To determine whether adjustment is necessary, perform the following road test:

1. Slide the ON/OFF switch to the on position;
2. Hold the SET key down and slowly accelerate the bike from 30kph to 50kph using the throttle. The cruise control should take over at about 40kph;
3. Depress one of the brake levers to turn the cruise control off;
4. Use the throttle to accelerate the bike up to 80kph and press the SET key. The cruise control should engage and smoothly maintain speed within 2kph;

- If the cruise control loses speed when engaged or is sluggish, increase the sensitivity adjustment by setting the sensitivity switch on the computer to the ‘H’ (High) position;
- If the cruise control gains speed when engaged or is erratic, decrease the sensitivity adjustment by setting the sensitivity switch on the computer to the ‘L’ (Low) position.
- MotorCycle Setup recommends you use the MEDIUM sensitivity switch position for high torque engines. These engines can produce rapid, unexpected and uncomfortable acceleration when controlled by the cruise control computer in high sensitivity mode.



Testing the electronic clutch switch.

The ECS switch may be road tested by setting the cruise on a suitable speed (ie. 60kph or 35 mph) while on a level road or slight uphill, and pulling in the clutch. The engine will rev higher initially but should drop quickly (within 1/2 second) back to idle. If this takes longer than this, check that there is no excess friction in the throttle mechanism that is slowing down the throttle and not allowing it to 'snap' shut.

The sensitivity of the switch is adjustable. The bottom of the box may be opened by releasing the two catches next to the wire entry hole. Beside the wire connection plug on the circuit board there is a black plastic 'jumper' block. This is a bridging connector to allow the two pins to be connected. This may be connected or disconnected from its pins to tailor the way the switch responds. Bridging the pins decreases the switch's sensitivity. This may be appropriate on fast revving sports engines. Disconnecting the pins increases the sensitivity. This is appropriate on slower revving touring engines. Try both settings to see what is suitable for your engine.

- The switch is supplied on the most sensitive setting with the jumper disconnected. The jumper is installed on one pin. The jumper may be removed, using a pair of long nose pliers, and then re-installed on both pins to decrease the sensitivity of the switch.

- If you cannot get the cruise to work at higher speeds jumper the pins to decrease sensitivity. If the switch takes too long to work, disconnect the pins to increase sensitivity.

- This completes the adjustment procedure.

13. TROUBLE SHOOTING, TESTING AND SELF-DIAGNOSTICS

See the attachment for detailed instructions.

WARNING: The computer, switch block and other components are water resistant - NOT WATERPROOF. When washing the bike avoid spraying or pouring water directly onto any component. It is recommended the switch be covered during washing.

The staff at MotorCycle Setup hope you enjoy using your new cruise control and use it wisely and safely. Remember that cruise controls are not a licence to concentrate less while riding. We recommend you approach all other road users with greater care when using the cruise control and use substantially larger safety margins when riding in traffic. Its use in built-up areas is not recommended.

You will probably find using the cruise control a bit disconcerting at first until you get used to the throttle moving under your hand and the slight 'hunting' (acceleration and deceleration) of the bike downhill. It is not possible to eliminate the latter effect as the computer continuously attempts to balance its set speed with the road speed.

NOTE: Practice turning the cruise control off quickly so that you will be ready for any emergency. Experience suggests touching the footbrake is the best and quickest way to turn the cruise control off.

If by chance you are not holding the right handlebar when you need to make an emergency stop, the first reaction is to grab the front brake and clutch. In doing so, you may inadvertently hold the throttle open depending on how much throttle the cruise control had applied at the time. If this happened the engine revs would rapidly rise because the clutch was disengaged. You may think the cruise control is malfunctioning. Release your grip on the throttle and the bike should return to idle. The best way to avoid this occurrence is to practice rolling the throttle off whenever you use the front brake.

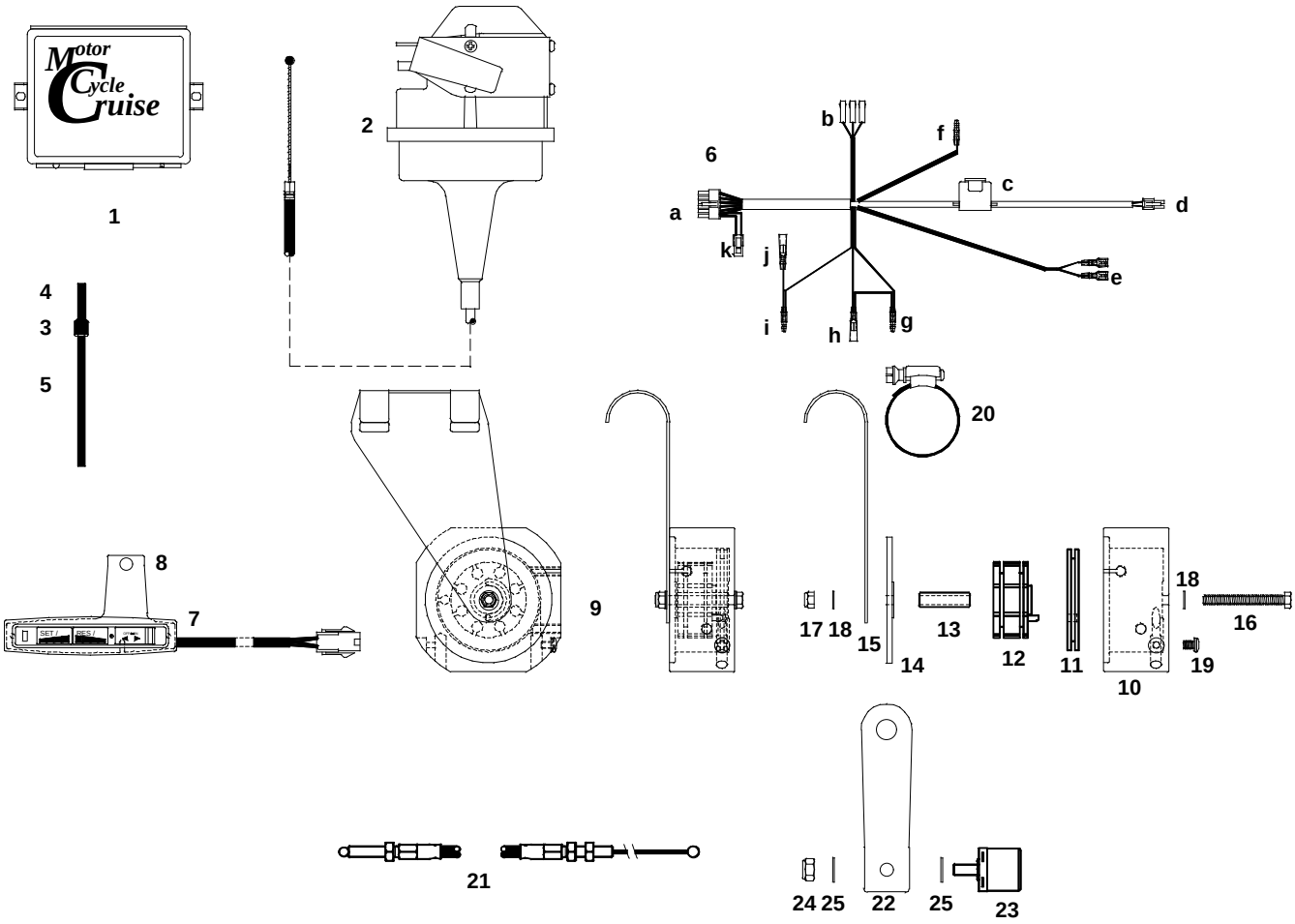
14. RIDING TIPS

The cruise control engages most smoothly when the engine is under load. We recommend SETTING or RESUMING cruise operation while holding a constant speed. Maintain speed using the throttle: a) for a couple of seconds after pressing the SET key to allow time for the cruise control to take up cable free play; and b) until you feel the cruise take over after pressing RESUME.

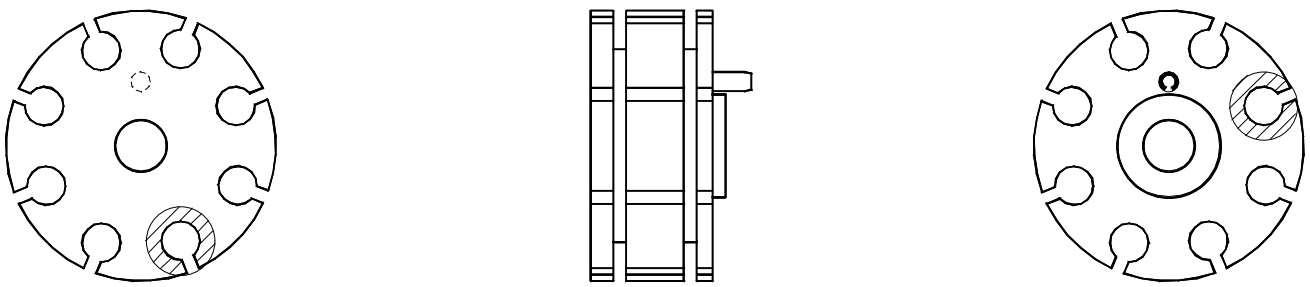
KAWASAKI Z1000GTR Concours
Part list for MCS 1100 kit

Item	Qty	Part Number	Description
1	1	MCS 02050H	Computer
2		MCS 1103	Vacuum actuator assembly
	1	MCS 020	Vacuum actuator
	1	MCS1103A	actuator bracket
	3		6 gauge x 3/8” pan head self tap screw
		MCS 1109	Vacuum hose assembly
3	1	MCS 032	Vacuum stop valve
4			4mm vacuum hose
5			4mm vacuum hose
6	1	MCS 1102	Wiring loom
a			Computer plug (12 pin)
b			Actuator plugs
c			Fuse holder (3 amp fuse)
d			Switch plug (4 pin)
e			Speed sensor connectors
f			Earth connector (green wire)
g			Power connector (Orange and red wires) Connect to red wire with the blue trace on the bikes loom
h			Brake sensor connector (Brown and red wires) Connect to brown wire on the brake light switch
i			Brake sensor connector (Brown and blue wires) Connect to the blue wire on the brake light switch
j			Brake light connector (blue wire) Connect to the blue wire with the red trace on the bikes loom
k			ECS plug (2 pin)
		MCS1104H	Switch assembly
7	1	MCS 019	Switch
8	1	MCS 004BH	Switch bracket
	2		2 gauge x 1/2” pan head self tap screw
9		MCS1108	Cable Interface Unit (CIU) assembly
10	1	MCS 1105	CIU housing
11	1	MCS 003M	Actuator spool
12	1	MCS 1106	Dual spool
13	1	MCS 003H	Bush
14	1	MCS 003J	End Cap
15	1	MCS 1107	CIU mounting bracket
16	1		Pivot bolt M5 x 45 plated bolt
17	1		Pivot nut M5 Nyloc nut
18	2		5mm plated flat washer
19	1		M4 x 6 pan head screw (actuator cable retainer)
20	2	Hose Clamp 24	Hose clamp
21	1	MCS 300	Carburettor cable
		MCS 1101	Speed sensor assembly
22	1	MCS 1101A	Speed sensor bracket
23	1	MCS 027	Speed sensor
24	1		M6 Nyloc nut
25	2		6mm plated flat washer
	2	MCS 039	magnet, 6mm dia x 6mm long
	2	MCS 030	Self adhesive pads (to mount computer)

10		100mm cable ties
4		150mm cable ties
4		200mm cable ties
1	MCS 1100ECS	Electronic Clutch Switch
		Instructions
		Trouble shooting guide
		Warranty sheet



Dual spool marking



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Kawasaki Z1000 GTR -all models ©

MOTORCYCLE SETUP PTY. LTD.

12 MONTH CONSUMER SATISFACTION GUARANTEE REGISTRATION

Please return this part to MotorCycle Setup, 7 Moritz Street, Box Hill, Victoria 3128, AUSTRALIA for warranty service

Name:_____

Address:_____

_____

Telephone Number:_____

Item Model Number:_____MCS 1100_____ Date Purchased_____

Name of Retailer:_____

Installed By:_____

Year, Make and Model of Motor cycle:_____

I have read the warranty agreement below and accept its terms.

Customer signature:_____

Warranty service requires a copy of the sales receipt.

---

12 MONTH WARRANTY

MotorCycle Setup Pty. Ltd., 7 Moritz Street, Box Hill, Victoria 3128, hereby warrant that it will repair or replace to the original purchaser products which prove to be defective under normal use and service in workmanship or material.

MotorCycle Setup obligation under this warranty is limited to the repair or replacement of the product at its option without charge for parts and labour at its warehouse located at the above address at Box Hill, when the product is returned with postal charges prepaid and examination of the product shall disclose it not to have been defective in the respects aforesaid during the warranty period.

The repairs or replacements will be made promptly and the repaired unit will be returned with all postal charges prepaid.

Coverage under this warranty is limited to the original purchase of the product at retail. When requesting warranty service, copy of the sales receipt must be submitted.

The warranty period for cruise controls is limited to a period of 12 months from the date of purchase or installation if by an authorised installer. No warranty is implied for the installation and therefore MotorCycle Setup will not be responsible for installation or re-installation charges.

This warranty does not apply to products or equipment or components used in conjunction with the cruise control.

Warranty doe not cover unauthorized repairs, improper installation or application, damage or misuse or product which has not been maintained or used in accordance with the operating specifications as set forth in the written instructions.

The warranty term shall not extend beyond its original term with respect to subsequent warranty replacement.

Under no circumstances shall MotorCycle Setup be liable for consequential damages or breach of this warranty or for any implied warranty.

MotorCycle Setup neither assumes nor authorizes any person to assume for it or any obligation or liability other than herein expressly stated.

MOTORCYCLE SETUP CUSTOMER SERVICE POLICY

You will receive free consultation on any problem you might encounter in the assembly or use of MotorCycle Setup products. Just drop us a note, email us at **mcsetup@netlink.net.au** or give us a call on **+61 3 9808 2804.**

You can obtain parts directly from MotorCycle Setup by writing to us. Use your packing list to describe your requirements.

If you are not satisfied with our service or with our products, write direct to the Managing Director, MotorCycle Setup Pty. Ltd., 7 Moritz Street, Box Hill, Victoria, Australia, 3128. He will make certain your problem receives immediate personal attention.

The benefits conferred by this guarantee are in addition to all other rights and remedies in respect of the product, which the consumer has under the Trade Practices Act, and other State and Territory Laws.

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